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ctt Leu 230	ggc Gly	tgg Trp	acc Thr	act Thr	gag Glu 235	cag Gln	atc Ile	acc Thr	gag Glu	cgt Arg 240	ttc Phe	ggt Gly	ttc Phe	tct Ser	gaa Glu 245	1436
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gca Ala	ttg Leu	ctg Leu	gag Glu 265	atc Ile	tac Tyr	cgc Arg	aag Lys	cag Gln 270	cgt Arg	cca Pro	ggc Gly	gag Glu	cag Gln 275	cct Pro	acc Thr	1532
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gtc Wal	atg Met	act Thr	tct Ser 345	cca Pro	aat Asn	ggt Gly	gaa Glu	gag Glu 350	atc Ile	cca Pro	gtc Val	gag Glu	acc Thr 355	gat Asp	gac Asp	1772
atc					aac Asn											1820
					gtc Val											1868
gag					cag Gln 395											1916
					gtc Val										Thr	1964
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			Arg										Leu		cgt Arg	2060
												Ser			ggc Gly	2108
															atc lle	2156

470					475					480					485	
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tac Tyr	ctt Leu	acc Thr 520	gct Ala	gat Asp	gag Glu	gaa Glu	gac Asp 525	cgc Arg	ttc Phe	gtt Val	gtt Val	gcg Ala 530	cag Gln	gca Ala	aac Asn	2300
acg Thr	cac His 535	tac Tyr	gac Asp	gaa Glu	gag Glu	ggc Gly 540	aac Asn	atc Ile	acc Thr	gat Asp	gag Glu 545	acc Thr	gtc Val	act Thr	gtt Val	2348
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cca Pro	ggt Gly 695	Thr	ttc Phe	aat Asn	ggt Gly	gaa Glu 700	Met	tcc Ser	ctt Leu	ggc	cgt Arg 705	g Asn	ctt Lei	cto Lei	g gtt ı Val	2828
gcg Ala 710	Phe	atg Met	cct Pro	tgg Trp	gaa Glu 715	Gly	cac His	aac Asn	tac Tyr	gaç Glu 720	Asp	geg Ala	ato Ile	ato E Ile	c ctc E Leu 725	2876

Ē	ac Asn	cag Gln	aac Asn	atc Ile	gtt Val 730	gag Glu	cag Gln	gac Asp	atc Ile	ttg Leu 735	acc Thr	tcg Ser	atc Ile	cac His	atc Ile 740	gag Glu	2	924
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•	ulg Val	cgt Arg	cac His 840	ttc Phe	tcc Ser	cgc Arg	gag Glu	gac Asp 845	gac Asp	gac Asp	gat Asp	ctg Leu	gct Ala 850	cct Pro	ggc Gly	gtc Val		3260
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		Āsp					Pro					Thr				gtg Val 965		3596
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			ġ	970				97	5				980				
cgt Arg	cca Pro	Asn .	cgc q Arg <i>l</i> 985	gac (Asp (ggc g Gly <i>F</i>	ac g	gtc at Val Me	et Va	t aa al As	ıc go sn Al	g ga .a As	it ggt sp Gly 995	, Lys	gca Ala	3692		
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₹210> 6

\$211> 1165

212> PRT

₹213> Corynebacterium glutamicum

<u><</u>400> 6

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Ala Pro Ile Glu Val Pro Gly Leu Leu Asp Leu Gln Leu Asp Ser Tyr 35 40 45

Ser Trp Leu Ile Gly Thr Pro Glu Trp Arg Ala Arg Gln Lys Glu Glu 50 60

Phe Gly Glu Gly Ala Arg Val Thr Ser Gly Leu Glu Asn Ile Leu Glu 65 70 75 80

Glu Leu Ser Pro Ile Gln Asp Tyr Ser Gly Asn Met Ser Leu Ser Leu 85 90 95

Ser Glu Pro Arg Phe Glu Asp Val Lys Asn Thr Ile Asp Glu Ala Lys
100 105

Glu Lys Asp Ile Asn Tyr Ala Ala Pro Leu Tyr Val Thr Ala Glu Phe 115 Val Asn Asn Thr Thr Gly Glu Ile Lys Ser Gln Thr Val Phe Ile Gly Asp Phe Pro Met Met Thr Asp Lys Gly Thr Phe Ile Ile Asn Gly Thr Glu Arg Val Val Ser Gln Leu Val Arg Ser Pro Gly Val Tyr Phe 170 Asp Gln Thr Ile Asp Lys Ser Thr Glu Arg Pro Leu His Ala Val Lys 185 180 Val Ile Pro Ser Arg Gly Ala Trp Leu Glu Phe Asp Val Asp Lys Arg 200 Asp Ser Val Gly Val Arg Ile Asp Arg Lys Arg Arg Gln Pro Val Thr 210 215 220 ij Val Leu Leu Lys Ala Leu Gly Trp Thr Thr Glu Gln Ile Thr Glu Arg 230 235 The Gly Phe Ser Glu Ile Met Met Ser Thr Leu Glu Ser Asp Gly Val Ala Asn Thr Asp Glu Ala Leu Leu Glu Ile Tyr Arg Lys Gln Arg Pro 265 U Gay Glu Gln Pro Thr Arg Asp Leu Ala Gln Ser Leu Leu Asp Asn Ser 275 280 Phe Phe Arg Ala Lys Arg Tyr Asp Leu Ala Arg Val Gly Arg Tyr Lys 295 Ile Asn Arg Lys Leu Gly Leu Gly Gly Asp His Asp Gly Leu Met Thr Leu Thr Glu Glu Asp Ile Ala Thr Thr Ile Glu Tyr Leu Val Arg Leu 325 His Ala Gly Glu Arg Val Met Thr Ser Pro Asn Gly Glu Glu Ile Pro Val Glu Thr Asp Asp Ile Asp His Phe Gly Asn Arg Arg Leu Arg Thr

Val Gly Glu Leu Ile Gln Asn Gln Val Arg Val Gly Leu Ser Arg Met 370 375 380 Glu Arg Val Val Arg Glu Arg Met Thr Thr Gln Asp Ala Glu Ser Ile 385 390 Thr Pro Thr Ser Leu Ile Asn Val Arg Pro Val Ser Ala Ala Ile Arg 405 410 Glu Phe Phe Gly Thr Ser Gln Leu Ser Gln Phe Met Asp Gln Asn Asn 420 Ser Leu Ser Gly Leu Thr Tyr Lys Arg Arg Leu Ser Ala Leu Gly Pro Gly Gly Leu Ser Arg Glu Arg Ala Gly Ile Glu Val Arg Asp Val His Pro Ser His Tyr Gly Arg Met Cys Pro Ile Glu Thr Pro Glu Gly Pro 465 ũ Asn Ile Gly Leu Ile Gly Ser Leu Ala Ser Tyr Ala Arg Val Asn Pro LII P. Phe Gly Phe Ile Glu Thr Pro Tyr Arg Arg Ile Ile Asp Gly Lys Leu 505 n Thr Asp Gln Ile Asp Tyr Leu Thr Ala Asp Glu Glu Asp Arg Phe Val 520 Val Ala Gln Ala Asn Thr His Tyr Asp Glu Glu Gly Asn Ile Thr Asp 535 Glu Thr Val Thr Val Arg Leu Lys Asp Gly Asp Ile Ala Met Val Gly 545 550 555 Arg Asn Ala Val Asp Tyr Met Asp Val Ser Pro Arg Gln Met Val Ser 565 570 Val Gly Thr Ala Met Ile Pro Phe Leu Glu His Asp Asp Ala Asn Arg 580 Ala Leu Met Gly Ala Asn Met Gln Lys Gln Ala Val Pro Leu Ile Arg 595 600 Ala Glu Ala Pro Phe Val Gly Thr Gly Met Glu Gln Arg Ala Ala Tyr 610 615 620

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Val Ser Ala Asp Phe Ile Thr Ile Met Ala Asp Asp Gly Lys Arg Glu 645 650 655

Thr Tyr Leu Leu Arg Lys Phe Gln Arg Thr Asn Gln Gly Thr Ser Tyr 660 665 670

Asn Gln Lys Pro Leu Val Asn Leu Gly Glu Arg Val Glu Ala Gly Gln 675 680 685

Val Ile Ala Asp Gly Pro Gly Thr Phe Asn Gly Glu Met Ser Leu Gly 690 695 700

Arg Asn Leu Leu Val Ala Phe Met Pro Trp Glu Gly His Asn Tyr Glu 720 715 720

Asp Ala Ile Ile Leu Asn Gln Asn Ile Val Glu Gln Asp Ile Leu Thr 725 730 735

Ser Ile His Ile Glu Glu His Glu Ile Asp Ala Arg Asp Thr Lys Leu
740 745 750

Gly Ala Glu Glu Ile Thr Arg Asp Ile Pro Asn Val Ser Glu Glu Val
 755 760 765

M

Feu Lys Asp Leu Asp Asp Arg Gly Ile Val Arg Ile Gly Ala Asp Val 770 780

Arg Asp Gly Asp Ile Leu Val Gly Lys Val Thr Pro Lys Gly Glu Thr 785 790 795 800

Ala Arg Glu Val Arg Asp Thr Ser Met Lys Val Pro His Gly Glu Thr 820 825 830

Gly Lys Val Ile Gly Val Arg His Phe Ser Arg Glu Asp Asp Asp Asp 835 840 845

Leu Ala Pro Gly Val Asn Glu Met Ile Arg Ile Tyr Val Ala Gln Lys 850 855 860

Arg Lys Ile Gln Asp Gly Asp Lys Leu Ala Gly Arg His Gly Asn Lys 865 870 Gly Val Val Gly Lys Ile Leu Pro Gln Glu Asp Met Pro Phe Leu Pro 890 Asp Gly Thr Pro Val Asp Ile Ile Leu Asn Thr His Gly Val Pro Arg Arg Met Asn Ile Gly Gln Val Leu Glu Thr His Leu Gly Trp Leu Ala Ser Ala Gly Trp Ser Val Asp Pro Glu Asp Pro Glu Asn Ala Glu Leu 935 Val Lys Thr Leu Pro Ala Asp Leu Leu Glu Val Pro Ala Gly Ser Leu Thr Ala Thr Pro Val Phe Asp Gly Ala Ser Asn Glu Glu Leu Ala Gly
975
975 Leu Ala Asn Ser Arg Pro Asn Arg Asp Gly Asp Val Met Val Asn 980 985 Ala Asp Gly Lys Ala Thr Leu Ile Asp Gly Arg Ser Gly Glu Pro Tyr 995 1005 Pro Tyr Pro Val Ser Ile Gly Tyr Met Tyr Met Leu Lys Leu His 1010 1015 U 題s Leu Val Asp Glu Lys Ile His Ala Arg Ser Thr Gly Pro Tyr 1025 1030 1035 Ser Met Ile Thr Gln Gln Pro Leu Gly Gly Lys Ala Gln Phe Gly 1040 1045 Gly Gln Arg Phe Gly Glu Met Glu Val Trp Ala Met Gln Ala Tyr 1055 Gly Ala Ala Tyr Thr Leu Gln Glu Leu Leu Thr Ile Lys Ser Asp 1075 1080 Asp Val Val Gly Arg Val Lys Val Tyr Glu Ala Ile Val Lys Gly Glu Asn Ile Pro Asp Pro Gly Ile Pro Glu Ser Phe Lys Val Leu

1105

Leu Lys Glu Leu Gln Ser Leu Cys Leu Asn Val Glu Val Leu Ser 1115 1120 Ala Asp Gly Thr Pro Met Glu Leu Ala Gly Asp Asp Asp Phe 1135 1140 Asp Gln Ala Gly Ala Ser Leu Gly Ile Asn Leu Ser Arg Asp Glu 1150 Arg Ser Asp Ala Asp Thr Ala 1160 <210> 7 <211> 1775 <212> DNA <213> Corynebacterium glutamicum ű **5**220> <u>\$</u>221> CDS ₹222> (500)..(880)**2**400> 7 Cagctetaca agagtgteta agtggeggge attecatget ttggaggage gatetteaaa 60 #tcctccaaa gtgagttgac ctcgggaaac agctgcagaa agttcatcca cgacttggtt 120 toggttaagg tcagtggcga gcttctttgc tggttcgttt ccttgaggaa cagtcatggg 180 aaccattcta acaagggatt tggtgttttc tgcggctagc tgataatgtg aacggctgag 240 teccaetett gtagttggga attgaeggea eetegeacte aagegeggta tegeceetgg 300 ttttccggga cgcggtggcg catgtttgca tttgatgagg ttgtccgtga catgtttggt 360 cgggccccaa aaagagcccc cttttttgcg tgtctggaca ctttttcaaa tccttcgcca 420 togacaaget cageettegt gttcgtcccc cgggcgtcac gtcagcagtt aaagaacaac 480 tccgaaataa ggatggttc atg cca act att cag cag ctg gtc cgt aag ggc 532 Met Pro Thr Ile Gln Gln Leu Val Arg Lys Gly 1 cgc cac gat aag tcc gcc aag gtg gct acc gcg gca ctg aag ggt tcc 580 Arg His Asp Lys Ser Ala Lys Val Ala Thr Ala Ala Leu Lys Gly Ser cet cag egt egt gge gta tge ace egt gtg tae ace ace ace eet aag 628

Pro Gln Arg Arg Gly Val Cys Thr Arg Val Tyr Thr Thr Pro Lys

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			atg Met													772
			tac Tyr 95													820
			aag Lys													868
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<211> 127

<212> PRT

-35-

<213> Corynebacterium glutamicum

<400> 8

4

Met Pro Thr Ile Gln Gln Leu Val Arg Lys Gly Arg His Asp Lys Ser 1 $$ 5 $$ 10 $$ 15

Ala Lys Val Ala Thr Ala Ala Leu Lys Gly Ser Pro Gln Arg Arg Gly 20 25 30

Val Cys Thr Arg Val Tyr Thr Thr Thr Pro Lys Lys Pro Asn Ser Ala 35 40 45

Leu Arg Lys Val Ala Arg Val Arg Leu Thr Ser Gly Ile Glu Val Ser 50 60

Ala Tyr Ile Pro Gly Glu Gly His Asn Leu Gln Glu His Ser Met Val

Eeu Val Arg Gly Gly Arg Val Lys Asp Leu Pro Gly Val Arg Tyr Lys
90 95

The Val Arg Gly Ala Leu Asp Thr Gln Gly Val Lys Asp Arg Lys Gln 100 105 110

Ala Arg Ser Pro Leu Arg Arg Glu Glu Gly Ile Ile Lys Asn Ala